

CLAIMS

1. (Currently Amended) A communication system, comprising:
an RF amplifier having a power supply input and a signal input; and
a phase bandwidth reduction module coupled to the signal input and configured for modifying an amplitude reducing a bandwidth of a phase component of an input signal provided on the signal input to reduce a bandwidth of the phase component.
2. (Currently Amended) The communication system of claim 1, further comprising:
a power supply amplifier coupled to the power supply input; and
an amplitude bandwidth reduction module coupled to an input of the power supply amplifier, the amplitude bandwidth reduction module configured for modifying amplitude variations reducing a bandwidth of an amplitude component of the input signal to reduce the bandwidth of the amplitude component.
3. (Original) The communication system of claim 2, further comprising:
a delay filter coupled between an output of the amplitude bandwidth reduction module and the input of the power supply amplifier.
4. (Original) The communication system of claim 3, further comprising:
a polar generator having an input for receiving the input signal, a first output for providing a phase signal component of the input signal, and a second output for providing the amplitude component of the input signal to the amplitude bandwidth reduction module.
5. (Original) The communication system of claim 4, wherein the polar generator includes a rectangular to polar converter.

6. (Original) The communication system of claim 5, further comprising:
a polar to rectangular converter having a first input coupled to an output of the phase bandwidth reduction module, a second input coupled to a first output of the rectangular to polar converter, and an output coupled to the RF amplifier.
7. (Original) The communication system of claim 6, further comprising:
an upconverter coupled to the output of the polar to rectangular converter and the signal input of the RF amplifier.
8. (Original) The communication system of claim 7, wherein the upconverter includes at least one local oscillator and one bandpass filter (BPF).
9. (Original) The communication system of claim 8 further comprising:
at least one digital to analog converter (DAC), one low pass filter (LPF), and one in-phase/quadrature (I/Q) modulator coupled together and coupled between the output of the polar to rectangular converter and an input of the upconverter.
10. (Original) The communication system of claim 9, wherein the input signal is a baseband or radio frequency signal that has a high peak-to-average power ratio.
11. (Original) The communication system of claim 10, wherein the input signal is a code division multiple access (CDMA) signal.
12. (Original) The communication system of claim 11, wherein the input signal is a CDMAOne, CDMA2000, or a WCDMA signal.

13. (Original) The communication system of claim 12, wherein the communication system amplifies the input signal using envelope elimination and restoration (EER).

14. (Currently Amended) The communication system of claim 13, wherein the phase bandwidth reduction module modifies the amplitude component ~~reduces the bandwidth of the~~ phase component of the input signal based on ~~using~~ a non-linear relationship between phase signal amplitude and CDMA signal amplitude.

15. (Currently Amended) The communication system of claim 14, wherein the amplitude bandwidth reduction module modifies amplitude variations ~~reduces the bandwidth of the~~ amplitude component of the input signal based on ~~using~~ a non-linear relationship between supply voltage to the RF amplifier and the CDMA signal amplitude.

16. (Currently Amended) The communication system of claim 14, wherein the phase bandwidth reduction module modifies the amplitude component ~~A_{phase} reduces the bandwidth of the~~ phase component of the input signal based on the ~~on a non-linear relationship~~

$A_{\text{phase}} = A_{\text{max}} \left(\frac{(1 - e^{px})}{(1 - e^p)} \right)$, where A_{max} represents a maximum amplitude of the input signal, x represents a normalized amplitude of the input signal, and p represents a variable adjustment parameter.

17. (Currently Amended) The communication system of claim 15, wherein the amplitude bandwidth reduction module modifies the amplitude variations ~~VDD reduces the bandwidth of the~~ amplitude component of the input signal based on the ~~on a non-linear relationship~~ $VDD = \left(x + be^{(-x/b)} \right) (V_{DD\text{max}})$, where V_{DDmax} represents a maximum amplitude of the

input signal, x represents a normalized amplitude of the input signal, and b represents a variable adjustment parameter.

18. (Currently Amended) The communication system of claim 2, wherein the phase bandwidth reduction module modifies the amplitude component ~~reduces the bandwidth~~ of the phase component of the input signal based on a non-linear relationship between phase signal amplitude and CDMA signal amplitude.

19. (Currently Amended) The communication system of claim 18, wherein the amplitude bandwidth reduction module modifies amplitude variations ~~reduces the bandwidth~~ of the amplitude component of the input signal based on a non-linear relationship between supply voltage to the RF amplifier and CDMA signal amplitude.

20. (Currently amended) The communication system of claim ~~18~~19, wherein the phase bandwidth reduction module modifies the amplitude component A_{phase} ~~reduces the bandwidth~~ of the phase component of the input signal based on the ~~on a~~ non-linear relationship $A_{\text{phase}} = A_{\text{max}} \left(\frac{(1 - e^{px})}{(1 - e^p)} \right)$, where A_{max} represents a maximum amplitude of the input signal, x represents a normalized amplitude of the input signal, and p represents a variable adjustment parameter.

21. (Currently Amended) The system of claim ~~19~~19[[20]], wherein the amplitude bandwidth reduction module modifies the amplitude variations VDD ~~reduces the bandwidth~~ of the amplitude component of the input signal based on the ~~on a~~ non-linear relationship $VDD = \left(x + be^{(-x/b)} \right) (V_{\text{DDmax}})$, where V_{DDmax} represents a maximum amplitude of the input

signal, x represents a normalized amplitude of the input signal, and b represents a variable adjustment parameter.

22. (Currently Amended) A base station in a wireless communications system, comprising:

an RF amplifier having a power supply input and a signal input; and
a phase bandwidth reduction module coupled to the signal input and configured for modifying an amplitude ~~reducing a bandwidth~~ of a phase component of an input signal provided on the signal input to reduce a bandwidth of the phase component.

23. (Currently Amended) The base station of claim 22, further comprising:
a power supply amplifier coupled to the power supply input; and
an amplitude bandwidth reduction module coupled to an input of the power supply amplifier, the amplitude bandwidth reduction module configured for modifying amplitude variations ~~reducing a bandwidth~~ of an amplitude component of the input signal to reduce the bandwidth of the amplitude component.

24. (Original) The base station of claim 23, further comprising:
a delay filter coupled between an output of the amplitude bandwidth reduction module and the input of the power supply amplifier.

25. (Currently Amended) The base station of claim 24, wherein the phase bandwidth reduction module modifies the amplitude component ~~reduces the bandwidth~~ of the phase component of the input signal based on ~~using~~ a non-linear relationship between phase signal amplitude and CDMA signal amplitude so as to reduce power leak through from a signal driver.

26. (Currently Amended) The base station of claim 25, wherein the amplitude bandwidth reduction module modifies amplitude variations ~~reduces the bandwidth~~ of the amplitude component of the input signal based on ~~using~~ a non-linear relationship between supply voltage to the RF amplifier and CDMA signal amplitude.

27. (Currently Amended) The base station of claim 25, wherein the phase bandwidth reduction module modifies the amplitude component ~~A_{phase}~~ ~~reduces the bandwidth~~ of the phase component of the input signal based on the ~~on a~~ non-linear relationship

$A_{\text{phase}} = A_{\text{max}} \left(\frac{(1 - e^{px})}{(1 - e^p)} \right)$, where A_{max} represents a maximum amplitude of the input signal, x represents a normalized amplitude of the input signal, and p represents a variable adjustment parameter.

28. (Currently Amended) The base station of claim 26, wherein the amplitude bandwidth reduction module modifies the amplitude variations ~~VDD~~ ~~reduces the bandwidth~~ of the amplitude component of the input signal based on the ~~on a~~ non-linear relationship

$VDD = \left(x + be^{(-x/b)} \right) (V_{\text{DDmax}})$, where V_{DDmax} represents a maximum amplitude of the input signal, x represents a normalized amplitude of the input signal, and b represents a variable adjustment parameter.

29. (Original) The base station of claim 28, wherein the input signal is a baseband or radio frequency signal that has a high peak-to-average power ratio.

30. (Original) The base station of claim 29, wherein the input signal is a code division multiple access (CDMA) signal.

31. (Original) The base station of claim 30, wherein the input signal is a CDMAOne, CDMA2000, or a WCDMA signal.

32. (Original) The base station of claim 30, wherein a base station transmitter amplifies input signal using envelope elimination and restoration (EER).

33. (Currently Amended) A method for processing a communication signal, comprising:
separating an input signal into an amplitude component signal and a phase component signal;
modifying an amplitude of the phase component signal to reduce a ~~reducing~~ bandwidth
of the phase component signal; and
controlling a signal input of an RF amplifier with the modified ~~reduced bandwidth~~ phase component signal.

34. (Currently Amended) The method of claim 33, further comprising:
modifying amplitude variations of the amplitude component signal to reduce a ~~reducing~~
bandwidth of the amplitude component signal; and
controlling a supply voltage input of the RF amplifier with the modified ~~reduced~~
~~bandwidth~~-amplitude component signal.

35. (Currently Amended) The method of claim 34, wherein modifying the amplitude of the phase component signals comprises modifying the amplitude of the phase component based on the bandwidth of the phase component signal is reduced by using a non-linear relationship between the amplitude of the phase component signal ~~amplitude~~ and a CDMA signal amplitude.

36. (Currently Amended) The method of claim 35, wherein modifying the amplitude variations of the amplitude component signal comprises modifying the amplitude variations based on the bandwidth of the amplitude signal component is reduced using a non-linear relationship between a supply voltage to the RF amplifier and the CDMA signal amplitude.

37. (Currently Amended) The method of claim 35[[36]], wherein modifying the amplitude of the phase component signals based on the non-linear relationship between the amplitude of the phase component signal and the CDMA signal amplitude comprises modifying the amplitude of the phase component signals based on, bandwidth of the phase component signal is reduced based on a non-linear relationship $A_{\text{phase}} = A_{\text{max}} \left((1 - e^{px}) / (1 - e^p) \right)$, where A_{max} represents a maximum amplitude of the input signal, x represents a normalized amplitude of the input signal, and p represents a variable adjustment parameter.

38. (Currently Amended) The method of claim 37, wherein modifying the amplitude variations based on the non-linear relationship between the supply voltage to the RF amplifier and the CDMA signal amplitude comprises modifying the amplitude variations based on the step of reducing the amplitude signal component bandwidth includes adjusting the phase component signal based on a non-linear relationship $V_{DD} = (x + be^{(-x/b)}) (V_{DD\text{max}})$, where $V_{DD\text{max}}$ represents a maximum amplitude of the input signal, x represents a normalized amplitude of the input signal, and b represents a variable adjustment parameter.

39. (Original) The method of claim 38, wherein the input signal is a baseband or radio frequency signal and has a high peak-to-average power ratio.

40. (Original) The method of claim 39, wherein the input signal is a code division multiple access (CDMA) signal.

41. (Original) The method of claim 40, wherein the input signal is a CDMAOne, CDMA2000, or a WCDMA signal.

42. (Original) The system of claim 41, wherein the method uses envelope elimination and Restoration (EER) to amplify the input signal.